Chapter 7

Understanding the Opioid Crisis

The opioid crisis poses a major threat to the U.S. economy and America's public health. Since 2000, more than 400,000 people have lost their lives because of opioids. This staggering number of deaths has pushed drug overdoses to the top of the list of leading causes of death for Americans under the age of 50 years, and has cut 2.5 months from U.S. life expectancy. The Council of Economic Advisers (CEA) has previously estimated that the annual economic cost of the opioid crisis is substantially higher than previously thought, at over half a trillion dollars in 2015. Using a similar methodology, the CEA estimates that the crisis cost $665 billion in 2018, or 3.2 percent of gross domestic product.

There are signs that the opioid crisis is past its peak because the growth in opioid overdose deaths has stopped during the Trump Administration, stopping the upward trend that has persisted since at least 1999. From January 2017 through May 2019, the CEA estimates that there were 37,750 fewer opioid overdose deaths—representing an economic cost savings of over $397 billion—relative to the number of deaths expected based on previous trends. Actions taken by the Trump Administration to reduce the supply of opioids, reduce new demand for opioids, and treat those with current opioid use disorder may have contributed to the flattening in overdose deaths involving opioids.

The Trump Administration understands that the crisis is ongoing and that there is much more work to do to combat this threat to American lives and the American economy. In order to continue mitigating the cost of the opioid crisis, it is crucial to understand all its underlying factors. We describe and analyze two separate waves of the crisis—the first wave, from 2001 to 2010, which was characterized by growing overdose deaths involving the misuse of prescription

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opioids; and the second wave, from 2010 to 2016, which was characterized by growing overdose deaths involving illicitly manufactured opioids (heroin and fentanyl).

We find that in the first wave, between 2001 and 2010, out-of-pocket prices for prescription opioids declined by an estimated 81 percent. This dramatic drop in prices was a consequence of the expansion of government healthcare coverage, which increased access to all prescription drugs—including opioids. We argue that these falling out-of-pocket prices effectively reduced the price of opioid use in the primary market and in the secondary (black) market for diverted opioids, from which most people who misuse prescription opioids obtain their drugs. We estimate that the decline in observed out-of-pocket prices is capable of explaining between 31 and 83 percent of the growth in the death rate involving prescription opioids from 2001 to 2010.

However, falling out-of-pocket prices could not have led to a major rise in opioid misuse and overdose deaths without the increased availability of prescription opioids resulting from the new specialty of pain management, the creation of pain management practices that encouraged liberalized dispensing practices by doctors, illicit "pill mills," increased marketing and promotion efforts from industry, and inadequate monitoring or controls against drug diversion. The subsidization of opioids is in stark contrast to the taxation of other addictive substances such as tobacco and alcohol. The dilemma this poses is how to make available the appropriate medical use of opioids for pain relief while preventing nonmedical use of subsidized products.

We find that the second wave of the opioid crisis likely started in 2010 because of efforts to limit the misuse of prescription OxyContin, enabling a large market for the sale and innovation of illegal opioids. Although these efforts eventually successfully reduced prescription opioid-involved overdose deaths, they had the unintended consequence of raising demand for cheaper substitutes in the illicit market among misusers of prescription drugs. An expansion in foreign-sourced supply was also important for the growth of illicitly manufactured opioids, as evidenced by falling quality-adjusted prices, largely due to expanded heroin trafficking from Mexico and relatively inexpensive synthetic opioids from both Mexico and China, specifically fentanyl and its analogues, which can be many times more potent than heroin.[1]

The Trump Administration has undertaken serious efforts to tackle the ongoing opioid crisis that continues to threaten the American economy and American lives. This is demonstrated by the declaration of the opioid epidemic as a public health emergency, the establishment of the President's Commission on Combating Drug Addiction and the Opioid Crisis, the highest expenditures in history directed toward the opioid epidemic, and ongoing efforts throughout the Federal government to address the crisis. The damage resulting from the opioid crisis is dramatic in its proportions compared with other health crises. For example, in 2017, the number of people who died of an opioid-involved drug overdose (47,600) exceeded the number of deaths from the HIV/AIDS epidemic at its peak in 1995 (CDC 2019).[2] Additionally, since 2000, the United States has lost as much of its population to the opioid crisis as it lost to World War II—with both causing more than 400,000 fatalities (DeBruyne 2017). This staggering number of deaths has pushed drug overdoses to the top of the list of leading causes of death for Americans under the age of 50 years, and has cut 2.5 months from U.S. life expectancy (Dowell et al. 2017).

To assess the full damage caused by this crisis, the CEA has previously assessed its full economic cost. In 2015 alone, the CEA estimated that the total cost of the opioid crisis was $504 billion, several times larger than previous cost estimates (CEA 2017). The CEA's approach constituted a more complete assessment of the costs because it incorporated the full cost of increased morbidity and mortality from the crisis. We also adjusted opioid-involved deaths—which had been underreported—upward and incorporated nonfatal costs. Using similar methods as in the earlier CEA assessment, the annual cost of the opioid crisis has only risen since 2015, amounting to $665 billion in 2018. The annual number of reported opioid-involved overdose deaths increased from 33,091 in 2015 to 47,600 in 2017, a 44 percent increase. According to preliminary data, deaths have since decreased slightly in 2018, an indication of a flattening in

[1]The CEA previously released research on topics covered in this chapter. The text that follows builds on this research paper produced by the CEA: "The Role of Opioid Prices in the Evolving Opioid Crisis" (CEA 2019b).

[2] We identify overdose deaths throughout the report using the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) underlying cause-of-death classification codes: X40–X44 (unintentional), X60–X64 (suicide), X85 (assault), and Y10–Y14 (undetermined). Deaths involving opioids are identified using ICD–10 multiple cause-of-death classification codes: T40.0–T40.4 and T40.6.

the trend of increasing annual deaths that has persisted since 1999 (see figure 7-1).[3]

When President Trump took office in January 2017, monthly overdose deaths involving opioids had reached an all-time record high, a 41 percent increase from the number of deaths 12 months earlier, in January 2016. Since then, the growth in opioid deaths may have finally stopped. Monthly overdose deaths fell by 9.6 percent between January 2017 and May 2019, the latest month for which provisional data are available (see figure 7-1). If the growth rate in opioid overdose deaths from 1999 through 2016 had continued, 37,750 additional lives would have been lost due to opioid overdoses between January 2017 and May 2019, a 33 percent increase over the actual number of deaths that occurred over this period. The economic cost savings since January 2017 from reduced mortality compared with the preexisting trend was over $397 billion.[4]

In order to continue mitigating the large costs imposed by the opioid crisis through appropriate policy measures, it is crucial to understand the forces that underlie it. We separate our analysis into two sections: The first one analyzes the first wave of the crisis, lasting through 2010, which was characterized by growth in prescription opioid-involved overdose deaths; and the second analyzes the period since 2010, which has been characterized by growth in illicit opioid-involved overdose deaths.[5]

During the first wave, between 2001 and 2010, the annual population-based rate of overdose deaths involving prescription opioids increased by 182 percent (CDC WONDER n.d.). Throughout this period, opioid manufacturers aggressively promoted the safety and effectiveness of opioids, and guidelines for the treatment of pain were liberalized to encourage physicians to prescribe

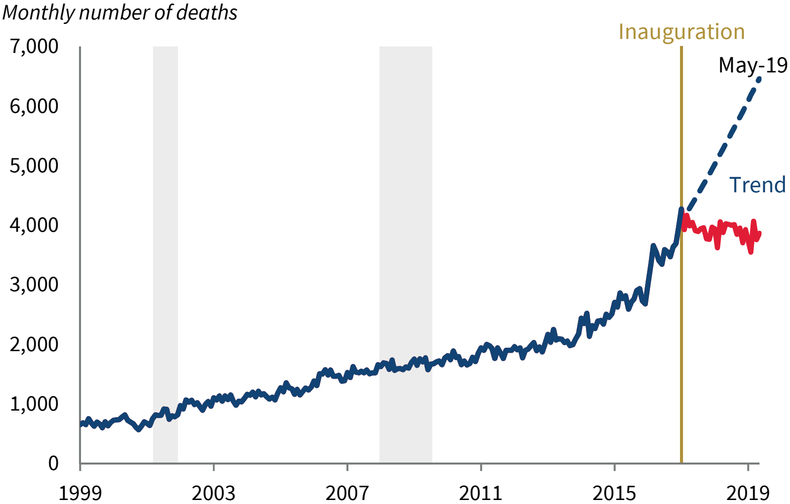
[3] Official estimates of opioid-involved overdose deaths are extracted from the CDC's WONDER Multiple Cause of Death Database (https://wonder.cdc.gov/mcd.html). As of December 31, 2019, official data were available through December 2017. Preliminary estimates of opioid-involved overdose deaths are extracted from Ahmad et al. (2019). The provisional data include deaths of foreign residents and include approximately 500 additional drug overdose records compared with data from CDC WONDER that is limited to residents of the United States.

[4] The number of lives saved is calculated from the difference between the projected trend in deaths from January 2017 to May 2019, the most recent month of preliminary data as of December 31, 2019 (see figure 7-1). The calculated number of lives saved is sensitive to the assumption that the projected trend is nonlinear. We use the value of a statistical life to estimate the value of lives saved, adjusting the Department of Transportation's value of a statistical life to about $10.5 million in 2018 dollars (DOT 2016).

[5] We use "illicit opioids" throughout the chapter to refer to illicitly produced opioids such as heroin and fentanyl, which excludes the misuse of prescription opioids such as OxyContin. It is important to note that data on overdose deaths do not distinguish between illicitly manufactured synthetic opioids, such as illicitly manufactured fentanyl, and synthetic prescription opioids, such as prescription fentanyl. This analysis includes this broader category of synthetic opioids other than methadone in the illicit opioid category, given that illicitly manufactured fentanyl is commonly believed to have dominated this category in recent years, and that the category was much less important in the earlier years of the crisis.

Figure 7-1. Opioid-Involved Overdose Deaths, 1999–2019

Monthly number of deaths



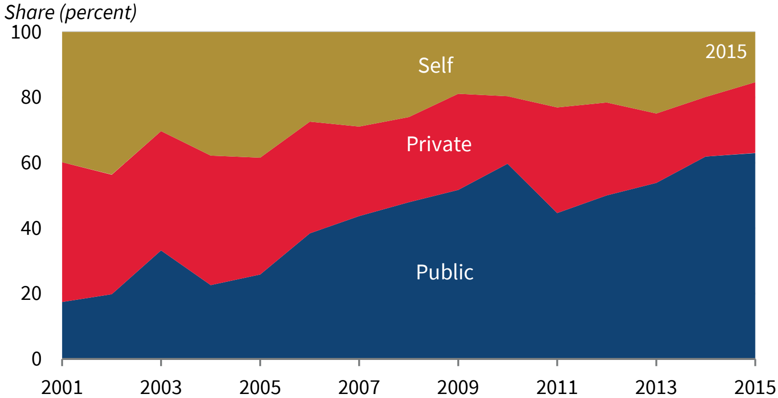
Sources: Centers for Disease Control and Prevention (CDC); CEA calculations.
Note: Data from before January 2018 are compiled from the CDC WONDER database, and monthly data beginning in January 2018 are calculated using the provisional reported number of deaths from the CDC. The preinauguration trend is calculated for January 1999 to January 2017. Shading denotes a recession.

more opioids (Van Zee 2009). Over the same period, we estimate that the out-of-pocket price of prescription opioids fell by 81 percent (see also Zhou, Florence, and Dowell 2016). We argue that the falling out-of-pocket price translated into a lower price of misuse not only for those who obtain prescriptions in the primary market but also for the majority of misusers who obtain prescription opioids from the secondary (black) market.

The decline in out-of-pocket prices between 2001 and 2010 occurred in conjunction with a rising share of generic opioids in the market as well as increased public subsidies. Though we do not attempt to apportion their respective roles, these two factors may have contributed significantly to the out-of-pocket price decline. With regard to a rising generic share in the prescription opioid market, we note that supply prices paid to pharmacies fell by 45 percent between 2001 and 2010, fueled by an increase in the cheaper generic opioid share, from 53 percent to 81 percent.

In addition, we document a large increase in the share of prescription opioids funded by public programs. As shown in figure 7-2, the share of prescribed opioids purchased with public subsidies increased from 17 percent in 2001 to 60 percent in 2010, rising further to 63 percent in 2015. Public programs accounted for three-fourths of the growth in total prescription opioids between 2001 and 2010 (data from the Medical Expenditure Panel Survey, MEPS). The introduction of the Medicare Part D prescription drug benefit in January 2006

Figure 7-2. Share of Potency-Adjusted Prescription Opioids, by Primary Payer, 2001–15



Sources: Medical Expendtiure Panel Survey; National Drug Code Database; CEA calculations.
Note: The primary payer is the third-party payer with the highest payment for a given prescription. In addition to Medicare, Medicaid, and private insurers, the other possible primary payers include veterans' benefits, workers' compensation, other Federal government insurance, other State or local goverment insurance, or other public insurance. All prescriptions are converted into morphine gram equivalents based on the quantity of pills prescribed and their potency.

coincided with a growing share of prescriptions reimbursed by the program, including for many opioids. Additionally, Social Security Disability Insurance (SSDI) enrollment has rapidly increased since the late 1990s (see figure 7-16). More than half of SSDI recipients received drug coverage before the 2006 start of Medicare Part D through Medicaid and other programs. After 2006, SSDI recipients, along with the general Medicare population, were for the most part eligible for prescription drug coverage through Medicare Part D.

Expansions in insurance coverage that reduce out-of-pocket prices make misused prescription opioids more affordable for patients with prescriptions and users who purchase the drugs on the secondary market. Before generics were as widely available, it was very costly for the average American with opioid use disorder to afford prescription opioids, if not subsidized through insurance. In 2007, Americans could buy 1 gram of OxyContin—one of the most common brand name opioids prescribed—for an average of $144 without health insurance. Some individuals on opioids may require up to a gram or more per day of OxyContin for pain relief (Schneider, Anderson, and Tennant 2009). Without insurance, a person with an opioid use disorder consuming between 0.5 gram and 1 gram of OxyContin every day for a year would have spent between $26,280 and $52,560 in 2007—which could be more than the median household income of about $50,000 in 2007 (in 2007 dollars) (Fontenot, Semega, and Kollar 2018).[6] To put this in perspective, a person on Medicare would only pay $9.78 per gram, or between $1,785 and $3,570 per year (in 2007 dollars), to support an opioid use disorder in the same year.

The subsidization of opioids is in stark contrast to the taxation of other addictive substances such as tobacco and alcohol. The challenge this poses is how to ensure access to opioids for legitimate medical needs, such as for pain relief, when other substances are contraindicated or insufficient, while not subsidizing nonmedical uses.

Given the role the government played in subsidizing the purchase of prescription opioids through the expansion of health insurance, we examine the possible roles of specific public programs. We find that the number of potency-adjusted opioids per capita subsidized by Medicare increased by 2,400 percent between 2001 and 2010, the largest increase among all third-party payers. SSDI rolls also expanded over this period. We estimate that SSDI recipients, who are generally eligible for Medicare (including prescription coverage in Part D, starting in 2006), were prescribed a disproportionate share of 26 to 30 percent of total potency-adjusted opioids in 2011 across all payer types (while representing under 3 percent of the U.S. population). Of course, any role of SSDI expansion in the opioid crisis would be attributable to the design of the program rather than program recipients. SSDI recipients generally have debilitating conditions that prevent them from working, and these conditions are often associated with high levels of pain. These conditions are the primary reason SSDI recipients are prescribed a disproportionate share of opioids; indeed, SSDI benefits, in conjunction with Medicare coverage, provide vital protection for these disabled workers. Additionally, the majority of SSDI recipients prescribed opioids use them appropriately and do not contribute to opioid misuse directly or indirectly.

As a calibration exercise, we take published estimates of the price elasticity of prescription opioid sales to estimate the increase in sales resulting from an 81 percent price decline. This exercise suggests that, without the price decline, per capita opioid sales would have increased by half as much or less than the actual increase between 2001 and 2010. In order to estimate the size of the price decline as a factor in the increase in the number of deaths involving prescription opioids, we assume that (1) secondary market prices are proportional to out-of-pocket prices in the primary market, and (2) the price elasticity of opioid use ranges from the elasticity of prescriptions at the low end to the own-price elasticity of heroin use at the high end. This second calibration

[6] Due to heightened risk to patients, the CDC recommends that physicians avoid prescriptions at or above 90 morphine milligram equivalents per day, equivalent to 60 milligrams of oxycodone or 0.06 gram, or carefully justify a decision to titrate dosage to 90 or more milligram equivalents per day (CDC n.d.). Schneider, Anderson, and Tennant (2009) observe that some chronic pain patients require doses that may range from 1,000 to 2,000 or more milligram equivalents per day. These doses would be equivalent to 667 to 1,333 milligrams (0.7 to 1.3 grams) of oxycodone per day.

exercise suggests that the observed decline in out-of-pocket prices for prescription opioids, which makes physicians' prescriptions more affordable for beneficiaries to fill, was a factor in between 31 and 83 percent of the increase in overdose deaths involving prescription opioids between 2001 and 2010.

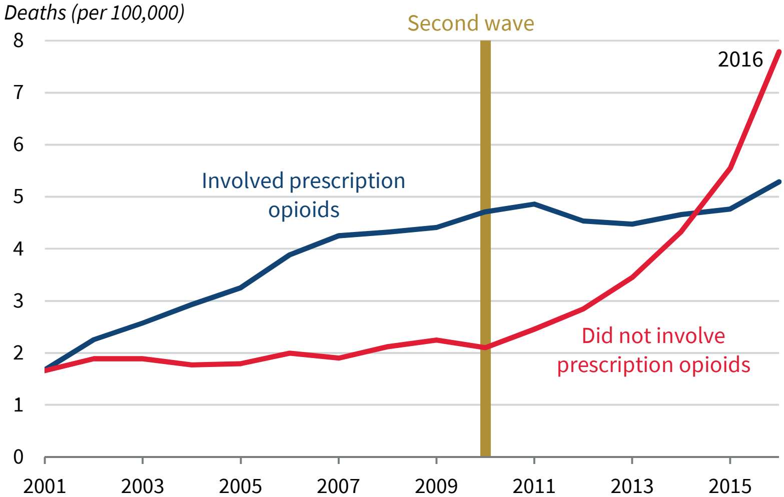
However, falling out-of-pocket prices could not have led to a major rise in opioid misuse and deaths without the increased availability of prescription opioids resulting from changes in pain management practice guidelines that encouraged liberalized dispensing practices by doctors, illicit "pill mills," increased marketing and promotion efforts from industry, and inadequate monitoring or controls against diversion. Without these factors, patients would have been unable to respond to lower prices by obtaining prescription opioids and diverting them to the secondary market. In other words, the change in the environment for obtaining prescription opioids was a precondition for the effect of falling out-of-pocket prices on opioid misuse. In addition, it is important to emphasize that the falling price of the *medical* use of opioids—due to expanded insurance coverage and generic entry—benefited patients because they could access needed drugs at a lower out-of-pocket cost. By contrast, the falling price of the *nonmedical* use of opioids, enabled by a lax prescribing environment in conjunction with lower out-of-pocket prices, may have played an important role in fueling the opioid crisis.

More generally, these findings of increased opioid misuse associated with the growth of public programs do not imply that these programs lack social value, but rather show the importance of instituting safeguards to ensure the appropriate prescribing and use of opioids, and measures to reduce the misuse of opioids.[7] Government policy for other addictive products, such as cigarettes, deliberately discourages consumption by raising prices through sales taxes and placing restrictions on purchase and sales; most analysts agree that such policies successfully reduced cigarette use and made new addiction cases less likely (HHS 2014). Unlike cigarettes, which are not safe or beneficial for anyone in any quantity, opioids have legitimate medical uses. The challenge of prescription opioids is balancing the goal of subsidizing opioids when they are prescribed for appropriate use with the need to discourage overprescription and misuse.

Next, we analyze the second wave of the opioid crisis, which was characterized by the growth of illicit, opioid-involved overdose deaths between 2010 and 2016. In this case, demand-side expansions due to efforts to curtail prescription opioid use disorder along with supply-side expansions appear to have been important. Most notably on the demand side, an abuse-deterrent formulation of the widely abused prescription opioid OxyContin was released in 2010, and the original formulation was no longer made available from the manufacturer. Research has found that although the reformulation stemmed

[7] See HHS (2016) for further discussion.

Figure 7-3. Opioid-Involved Overdose Death Rate by the Presence of Prescription Opioids, 2001–16



Sources: CDC WONDER; CEA calculations.
Note: Prescription opioids include both natural and semisynthetic opioids (T40.2) and also methadone (T40.3).

the rise of overdose deaths involving prescription opioids, it led opioid misusers to substitute toward cheaper, more available heroin, resulting in increased heroin-involved deaths (Alpert, Powell, and Pacula 2018; Evans, Lieber, and Power 2019). Thus, the buildup of a pool of people with addictions to prescription opioids during the first wave ultimately facilitated the increase in demand for illicit opioids in the second wave. This large pool of new demand created additional profit opportunities for illegal sellers entering the market. Supply increased as Mexican heroin traffickers increased shipments to the United States in response to shrinking markets for cocaine, and other foreign manufacturers—especially in China—introduced cheaper and more potent synthetic opioids like fentanyl. Figure 7-3 illustrates how overdose deaths involving prescription opioids leveled off after 2010, while other opioid deaths (those only involving illicit opioids and possibly nonopioid drugs) escalated rapidly.

In an attempt to assess the relative importance of demand and supply expansions in driving the second wave of the opioid crisis, we estimate the price of illicit opioids over time. Though these estimates are subject to a number of highly imperfect assumptions, we find that the price of illicit opioids was roughly constant between 2010 and 2013, before falling by about half by 2016, due to the increased supply of illicit fentanyl (see figure 7-17) starting in about 2013 (increasingly available via shipment from China and from other foreign sources). Given the extreme potency and low cost of fentanyl, it dramatically reduced the "cost of a high" for users. It is notable that even though demand for illicit opioids increased beginning in 2010, the price of illicit opioids remained constant until about 2013, implying that in these first years of the illicit wave, the heroin supply must have also expanded to keep prices steady; if supply had remained constant, prices would have risen. Falling prices between 2013 and 2016 imply that supply expansions of illicit opioids were more important drivers of the crisis in these later years.

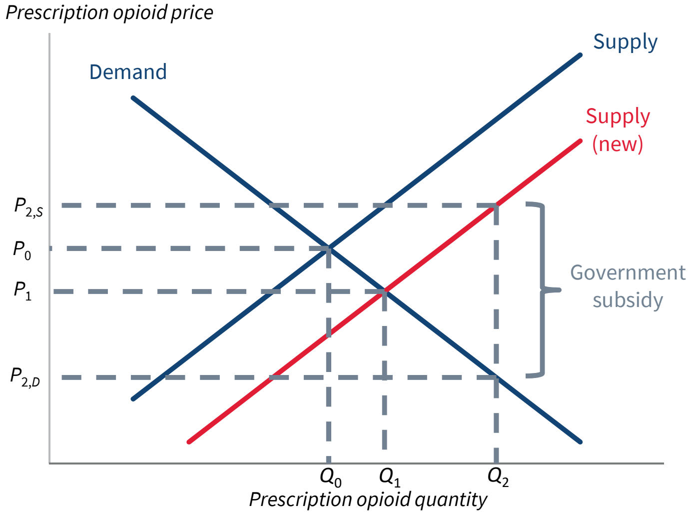
Due to constraints on data availability for prices of both prescription and illicit opioids, this analysis focuses on the period ending in 2016. However, provisional mortality data are available through part of 2019.

The rest of the chapter proceeds as follows. The next section presents our basic methodology in assessing how demand, supply, and government policies can affect quantities and prices of opioids. The subsequent section analyzes the first wave of the crisis based on prescription opioids, and the section after that analyzes the substantial growth in public subsidies for opioids during this period. The last section turns to the second wave, which spawned the rise of illicit opioids.

The Supply-and-Demand Framework

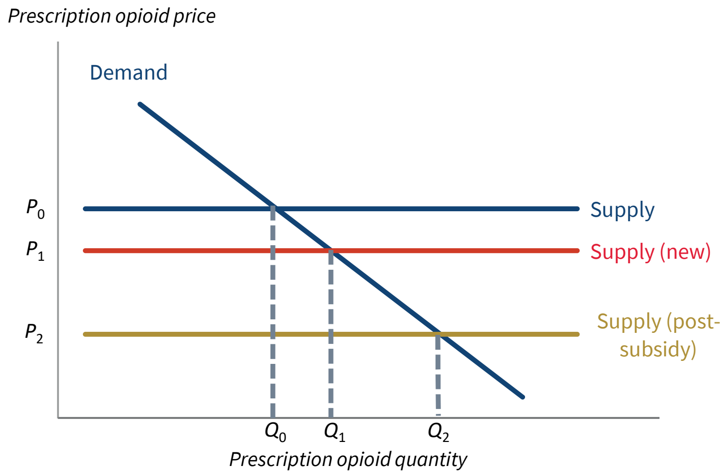
Although we cannot quantify the extent to which government-subsidized drugs are diverted and resold for nonmedical use, a simple supply-and-demand framework can provide powerful insights into how changing prices and quantities reflect the underlying forces driving the opioid crisis. Figures 7-4 and 7-5 consider the case of prescription opioids, showing how market dynamics and government subsidies in the primary market ultimately affect market prices and quantities in the secondary market. First, a supply expansion (e.g., due to generic entry) in the primary market for patients obtaining opioids via prescription reduces the price of prescription opioids (from P_0 to P_1) and increases the quantity prescribed (from Q_0 to Q_1)—assuming, of course, that prescribers are willing to provide additional pills to patients as their demand rises. This expansion has the effect of reducing the price of prescription opioids in the secondary market because individuals purchasing prescription opioids in the primary market now face a lower acquisition cost if pills are diverted to family members, friends, and others. On top of a supply expansion, the introduction of a government subsidy for prescription opioids in the primary market drives a wedge between the price consumers pay (the demand price, $P_{2,D}$) and the price prescription drug suppliers receive (the supply price, $P_{2,S}$), with the difference made up by the amount of the subsidy. The demand price is lower than the price paid by patients before the introduction of the subsidy (P_1), which further reduces the price of prescription opioids in the secondary market. Thus, both supply expansions and government subsidies in the primary market for prescription opioids decrease the price and increase the quantity of opioid misuse in the secondary market, especially in an environment where there is overprescribing. As noted above, however, whether secondary market prices

Figure 7-4. Effect of Supply Expansions and Government Subsidies on the Price and Quantity of Prescription Opioid Misuse, Primary Market



Note: This figure shows the impact on prices and quantities of an outward supply shift and government subsidy in the primary market for prescription opioids.

Figure 7-5. Effect of Supply Expansions and Government Subsidies on the Price and Quantity of Prescription Opioid Misuse, Secondary Market



Note: This figure shows the corresponding impact of an outward supply shift and government subsidy in the primary market (shown in figure 7-4) on prices and quantities in the secondary market.

can actually respond to changes in the primary market depends on an environment in which obtaining prescriptions is relatively easy.

Figures 7-6 and 7-7 consider the case of illicit opioids (i.e., heroin and illicitly manufactured fentanyl), for which a legal market does not exist. Because the quantity of illicit opioid use increased substantially between 2010 and 2016, it stands to reason that demand or supply expanded, or both did. However, whether it was demand or supply that drove the increase in illicit opioid misuse has a testable implication. If demand expansions dominate, then the price of illicit opioids must rise, whereas if supply expansions dominate, then the price must fall.[8] In fact, we find that illicit opioid prices were relatively stable between 2010 and 2013, suggesting that both demand—itself fueled in part by efforts to curtail the prescription opioid wave of the crisis—and supply expansions were important during this period. Then, between 2013 and 2016, the price of illicit opioids fell markedly with the influx of illicitly manufactured fentanyl, suggesting that supply expansions were most important during this later period.

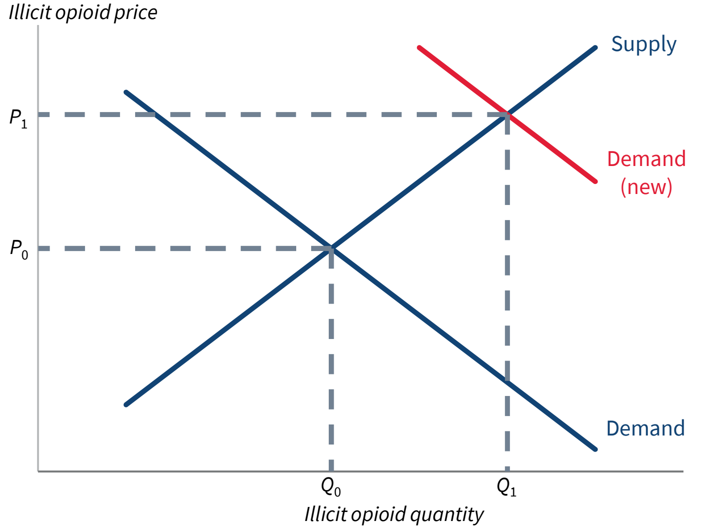
Our findings suggest that subsidies and supply expansions, in combination with changes in prescribing behavior, can account for much of the rise in opioid overdose deaths. Some have argued that demand-side factors, such as economic stagnation in past years, was an important driver of increasing mortality from drug use and other causes (Stiglitz 2015). However, there is direct evidence that demand growth due to worsening economic conditions was not the primary factor driving the growth of the opioid crisis.

First, the hypothesis that lower incomes raise demand does not explain the aggregate time series within the United States. If worsening economic conditions increase demand, then one would expect that the Great Recession would have fueled a substantial increase in opioid-involved overdose fatalities. However, figure 7-8 suggests that the growth rate of opioid-involved overdose deaths was unaffected by the Great Recession. The crisis grew at roughly the same pace straight through one of the greatest recessions experienced in the last century, and in fact picked up growth well after the recession ended. More important, two of the four lowest growth rates in opioid deaths occurred between 2008 and 2010, in the midst of the Great Recession. It was not until 2014, 2015, and 2016 that growth rates again rose significantly—but that was in a period of lower unemployment, the opposite prediction of demand growth of opioids being fueled by lower incomes unless effects are lagged by several years.

Despite this lack of association between aggregate economic conditions and opioid deaths, Hollingsworth, Ruhm, and Simon (2017) do report a positive association between county-level unemployment and opioid-involved overdose deaths—a 1-percentage-point increase in a county's unemployment

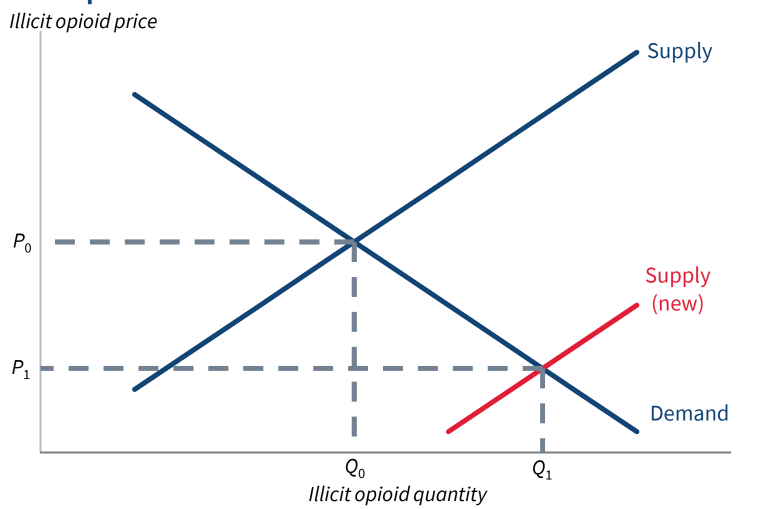
[8] The relative price elasticities of demand and supply also affect which expansion dominates.

Figure 7-6. Effect of Demand Expansions on the Quantity and Price of Illicit Opioids



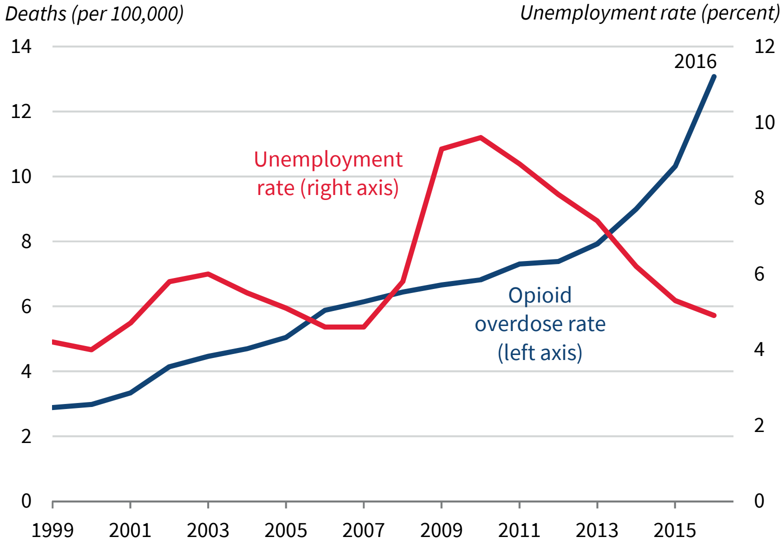
Note: This figure shows the impact of demand shifting outward while the supply curve remains in place; in this case, the price must rise.

Figure 7-7. Effect of Supply Expansions on the Quantity and Price of Illicit Opioids



Note: This figure shows the impact of supply shifting outward while the demand curve remains in place; in this case, the price must fall. If the price falls while the quantity increases, then the supply must have expanded.

Figure 7-8. Opioid Overdose Death and Unemployment Rate, 1999–2016



Sources: CDC WONDER; Bureau of Labor Statistics; CEA calculations.

rate is associated with a 0.19-person increase in the rate of opioid-involved overdose deaths per 100,000. However, this association does not appear quantitatively large enough to be a primary driver of the massive growth in opioid deaths. It would take a 54-percentage-point increase in the unemployment rate between 1999 and 2016 to explain the 10.2-person increase in the rate of opioid-involved overdose deaths during this period. However, the unemployment rate increased by a net 0.7 percentage point (from 4.2 to 4.9 percent) between 1999 and 2016.

In addition, Ruhm (2019) formally tests whether a number of demand-side factors that reflect changing economic conditions can explain the growing crisis during this period. He finds that very little of the rise in opioid overdose deaths during this period can be explained by economic conditions. Instead, he points to changes in the drug environment, reflective of supply conditions, as being central. Consistent with Ruhm's findings, Currie, Yin, and Schnell (2018) find no clear evidence of a substantial overall effect of the employment-to-population ratio on the amount of opioids prescribed in a county.

The First Wave of the Crisis: Prescription Opioids

The opioid crisis unfolded in two waves. The first wave, beginning in about 2001 and lasting until about 2010, was characterized by a rising misuse of prescription opioids.[9] The second wave began in about 2010, when, prescription opioids were made more difficult to abuse and illicit opioids—including heroin and, more recently, illicitly manufactured fentanyl—grew in the market. This and the next sections focus on the first wave, and the subsequent section focuses on the second wave.

Between 2001 and 2010, the rate of overdose deaths involving prescription opioids (which we define as natural and semisynthetic opioids and methadone) increased by 182 percent, while other opioid-involved deaths grew much more slowly (figure 7-3).[10] In order to analyze the potential roles of expanded supply of prescription opioids, we first estimate the out-of-pocket price of prescription opioids. We then conduct a calibration exercise, in which we assume that secondary market prices for prescription opioids are proportional to out-of-pocket prices, and that prescription opioid misusers respond to these prices of misuse in the same way that heroin users respond to heroin prices. We also assume that prescription opioid deaths are proportional to prescription opioid misuse. If falling prices suggest a large quantity response relative to the magnitude of the observed increase in prescription opioid-involved overdose deaths, then this would suggest that these price declines, when combined with other factors, may have played a role in the first wave of the opioid crisis.

An environment in which opioid prescriptions were promoted and easier to obtain and fill is a necessary precondition for falling out-of-pocket prices to have played a substantial role—otherwise, it is unlikely that secondary market prices could have responded to falling out-of-pocket prices. This environment was created by a campaign to persuade doctors that pain was being undertreated and that opioids were the solution. Pain-alleviation societies, patient advocacy groups, and professional medical organizations urged physicians to treat pain more aggressively (Max et al. 1995). Pain was labeled "the 5th Vital Sign," which should be regularly assessed and treated (VA 2000). Starting in 2001, the Joint Commission, an accrediting body for hospitals and other health facilities, instituted new standards requiring facilities to establish procedures to assess the existence and intensity of pain and to treat it with "effective pain medicines." At the same time, multiple medical organizations promoted opioids as a safe and effective treatment for chronic, noncancer pain (DuPont, Bezaitis, and Ross 2015). This coincided with aggressive marketing efforts by opioid manufacturers starting in the late 1990s to assure physicians that their products were safe with little abuse potential (Van Zee 2009; President's

[9] We focus on the 2001–10 period throughout the chapter, due to the unavailability of consistent overdose data before 1999, the unavailability of illicit drug seizure data before 2001 used for estimating the illicit opioid price series, and the substantial volatility in the out-of-pocket price series before 2001.

[10] Some opioid-involved deaths include both prescription and other opioids. Figure 7-3 distinguishes between opioid-involved overdose deaths with prescription opioids present versus those without prescription opioids present. Similarly, figure 7-18 distinguishes between opioid-involved overdose deaths with illicit opioids present versus those without illicit opioids present.

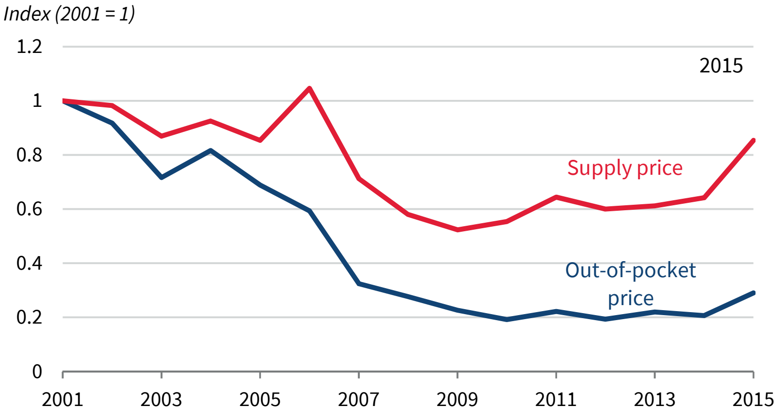
Commission 2017). Because of space limitations, this chapter does not provide a comprehensive review of either the change in medical guidance regarding the appropriate use of opioids or the marketing and promotion efforts by opioid manufacturers.

We use the Medical Expenditure Panel Survey to construct a time series of the out-of-pocket price per potency-adjusted unit of prescription opioids. The MEPS asks respondents to report all prescription drugs they obtain and how much they pay out of pocket for each drug. Opioid prescriptions are converted into morphine gram equivalents (MGEs), and then prices are estimated by dividing expenditures by the total number of MGEs. We use the terms MGEs and potency-adjusted units interchangeably throughout. Prices are converted into real dollars, and then a real price index is shown. Figure 7-9 shows the real supply and out-of-pocket price index for prescription opioids. The supply price is calculated as the ratio of total expenditures to total MGEs, and the out-of-pocket price is calculated as the ratio of self (out-of-pocket) expenditures to total MGEs. Note that out-of-pocket expenditures include individual payments made for prescriptions without third-party coverage as well as individual copayments made for prescriptions that are only partially covered by third parties.

Between 2001 and 2010, the out-of-pocket price fell by 81 percent before stabilizing. One potential factor in this decline, which is analyzed in depth in the next section, was the inception of Medicare Part D in 2006, which introduced subsidies for prescription drugs, including opioids, and lowered the out-of-pocket price for enrolled consumers. Another potential factor was the rapid expansion of disability (SSDI) enrollment, which before 2006 provided drug coverage for many enrollees through Medicaid or other programs, and after 2006 provided coverage through Medicare Part D. Finally, between 2001 and 2010, supply prices fell by 45 percent in conjunction with the expansion of generic opioids. A recent analysis by the Food and Drug Administration (FDA) similarly finds that potency-adjusted opioid acquisition prices for pharmacies fell by about 28 percent during this same period, although it also finds that prices substantially increased during the 1990s before the crisis took off (FDA 2018a). Figure 7-10 shows the decline in the brand market share of potency-adjusted opioids as the generic market share rose from about 55 to 81 percent between 2001 and 2010 (FDA 2018a).

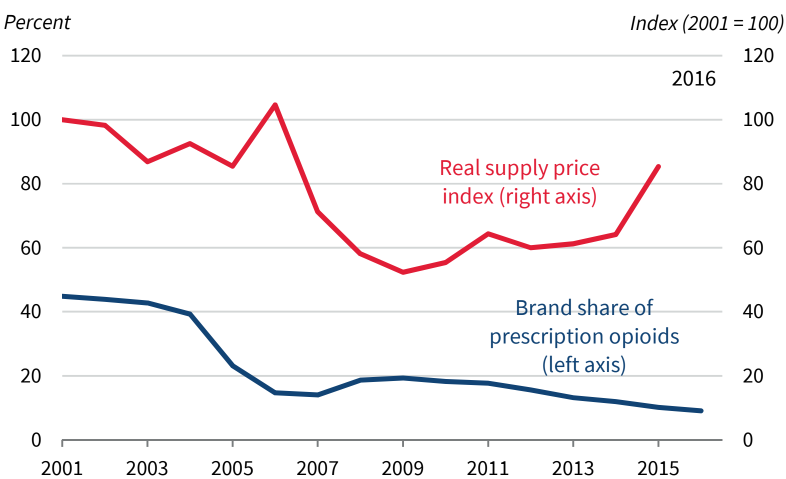
The law of demand says that, all else remaining the same, consumers engage in more of an activity when the activity becomes cheaper. However, the law by itself does not tell us the magnitude of the effect of an 81 percent reduction in the potency-adjusted price of prescription opioids on either the quantity of prescriptions or the number of deaths involving prescription opioids. Previous econometric studies that have related opioid prescriptions and other prescriptions to out-of-pocket prices suggest a range of likely quantitative effects of the price changes shown in figure 7-9 on the number of opioid

Figure 7-9. Real Supply Price and Real Out-of-Pocket Price Index of Potency-Adjusted Prescription Opioids, 2001–15



Sources: Medical Expenditure Panel Survey; National Drug Code Database; Bureau of Labor Statistics; CEA calculations.
Note: Prices are calculated by dividing real total spending in a given year by the total number of morphine gram equivalents prescribed in that year. All prescriptions are converted into morphine gram equivalents based on the quantity of pills prescribed and their potency, using the National Drug Code database.

Figure 7-10. Brand Share of Potency-Adjusted Prescription Opioids and Supply Price, 2001–16



Sources: Food and Drug Administration (2018a); Medical Expenditure Panel Survey; CEA calculations.
Note: Price data are available up to 2015. Brand share data are provided up to 2016.

prescriptions. Predicting the effect on the number of deaths requires additional information because the deaths derive from misuse. Only a fraction of opioid prescriptions is given to people with opioid use disorder, and their price sensitivity of demand may differ from the sensitivity of average consumers.

We begin with the effect of reduced prescription opioid prices on the number of opioid prescriptions. A number of studies look at the effects of drug prices and insurance coverage on the sales of all prescription drugs as well as the sales of opioid prescriptions specifically. The more responsive drug users are to prices, the more they consume as prices decline. This price responsiveness is typically measured by the price elasticity of demand—the percentage change in quantity demanded when the price increases by 1 percent.[11] Because elasticity studies typically make cross-sectional comparisons, they are holding constant physician prescribing norms and marketing efforts by sellers that are changing over time. In other words, the effects of changing prescribing norms and marketing efforts need to be added to the price effects measured by the cross-sectional studies of the price elasticity of demand. Box 7-1 offers an overview of the ongoing opioid settlements between governments and opioid manufacturers over misleading marketing efforts by the manufacturers.

Soni (2018) found that the introduction of Medicare Part D increased opioid prescriptions for the population age 65 to 74 (relative to the population age 55 to 64 and not on Medicare) over a four-year period by a factor of 1.5. At the same time and for the same population, Soni (2018) found that the out-of-pocket price was reduced by a factor of 0.44 from the introduction of Part D, which is less than the price change for the entire U.S. population from 2001 to 2010, as shown in figure 7-9. These estimated effects of Part D are economically significant and do not support the hypothesis that the changes shown in figure 7-9 have a minimal effect on the number of prescriptions. Indeed, they show an arc elasticity (calculated with the natural logarithm) of –0.49 which suggests that the price change shown in figure 7-9 would increase potency-adjusted prescriptions per capita by a factor of 2.3 between 2001 and 2010. A factor of 2.3 is close to the actual change as estimated with data from the Automation of Reports and Consolidated Orders System (ARCOS) and shown in figure 7-11 (DOJ n.d.).

Insurance plans should have coinsurance rates varying across drugs to the extent that the sensitivity of consumer demand to the out-of-pocket price varies across drugs (Feldstein 1973; Besley 1988). Health insurance plans behave that way in practice (Einav, Finkelstein, and Polyakova 2018). Coinsurance rates for opioids (43 percent) are higher than for other common therapeutic classes (39 percent). Similarly, coinsurance rates for hydrocodone

[11] When sales effects are estimated from small price changes, the result is sometimes called "point elasticity." "Arc elasticity" refers to an estimate from large price changes and typically uses midpoints for calculating percentage changes or uses logarithm changes so that the same elasticity can be applied to price increases as to price decreases.

Box 7-1. Opioid Crisis Lawsuits

Thousands of municipal governments nationwide and nearly two dozen states have sued the pharmaceutical industry in an effort to hold opioid manufacturers and distributers accountable for the opioid crisis. These lawsuits argue that opioid manufacturers launched misleading marketing campaigns underplaying the risks and exaggerating the benefits of opioids. Additionally, these lawsuits allege that opioid distributors unlawfully allowed the drugs to proliferate.

These civil litigation cases have resulted in the conclusion of multiple settlement agreements, at least one large trial, and the promise of more settlements to come. OxyContin maker Purdue Pharma, as well as its owners, the Sackler family, announced a tentative settlement expected to be worth more than $10 billion in September 2019. Under the proposed agreement, the company will be restructured into a public corporation, with profits from drug sales going toward the plaintiffs. The settlement would be the largest payout from any company involved in the opioid crisis. Purdue Pharma previously agreed to pay a total of $270 million to Oklahoma to settle a lawsuit in March 2019. Purdue's Oklahoma settlement set the stage for subsequent settlements with the State, including Teva Pharmaceutical's $85 million settlement in May 2019. Johnson & Johnson refused to settle, and the landmark trial resulted in an order to pay $572 million to Oklahoma in August 2019. Both the State and Johnson & Johnson are contesting this verdict—alleging, respectively, that the award is too small or too large.

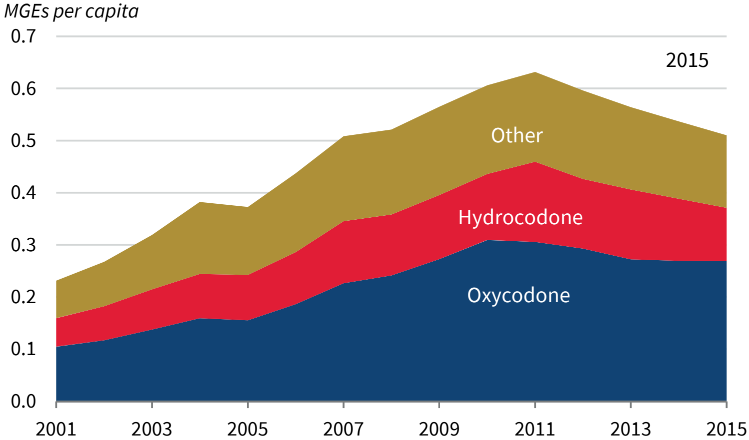
The three largest drug distributors—McKesson, Cardinal Health, and AmerisourceBergen—and the generic opioid manufacturer Teva Pharmaceuticals reached a settlement worth about $260 million in October 2019. These settlements are the early conclusions to nearly two years of legal battles and may serve as a benchmark for resolution in other opioid cases. The first of a new series of Federal trials began on October 21, 2019, after talks dissolved of a deal worth $48 billion to resolve all opioid lawsuits filed against the three drug distributors, Teva, and Johnson & Johnson.

The settlements include a combination of donations to substance use disorder treatment program research, and cash payouts and will likely provide a benchmark for thousands of similar cases brought before the courts in an attempt to hold pharmaceutical companies accountable for an opioid crisis that has killed hundreds of thousands and cost trillions.

(50 percent) are higher than for other common nonopioid drugs (40 percent). The observed coinsurance rates thus suggest that opioid prescriptions are not less price sensitive than the average prescription drug over the annual time frame (or longer) that is of interest to the sponsors of insurance plans.[12] If

[12] The coinsurance rates are inferred from the estimates by Einav, Finkelstein, and Polyakova (2018) and are for Part D participants who have not yet reached the "donut hole."

Figure 7-11. Potency-Adjusted Quantity (MGEs) of Prescription Opioids per Capita in the United States, 2001–15



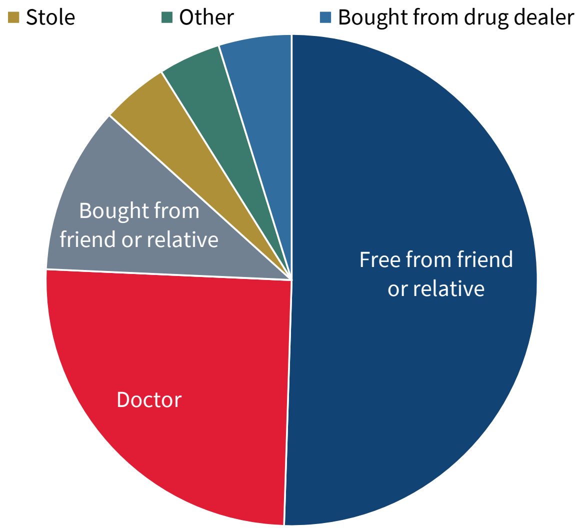
Sources: Automation of Reports and Consolidated Orders System; National Drug Code database; CEA calculations.
Note: MGEs = morphine gram equivalents. Quantities are converted into MGEs and divided by the total U.S. population in a given year to calculate MGEs per capita.

Einav, Finkelstein, and Polyakova (2018)'s one-month arc elasticity of –0.27 for therapeutic drug classes were applied to the price change from 2001 to 2010 shown in figure 7-9, it suggests that opioid prescriptions would have increased by a factor of 1.6 due to price changes alone.[13]

A factor of 1.6 is economically significant, but is still only a minority of the actual change in opioid prescriptions between 2001 and 2010. The discrepancy between the findings of Soni (2018) and Einav, Finkelstein, and Polyakova (2018) could be that behavior is more sensitive to a price change that lasts more than one month, or that applies to a larger population of people.[14] But this discrepancy may also reflect the imprecision of estimating price effects, which is why our data are consistent with the view that the increase in prescriptions cannot be explained by price reductions alone but also reflect changes in physicians' prescribing norms and marketing efforts by opioid sellers.

[13] Einav, Finkelstein, and Polyakova (2018) report a point elasticity for a linear demand curve, but their reports of price and quantity changes are sufficient for their readers to calculate the corresponding arc elasticity. We also note that the authors' elasticity is estimated for a selected group of Part D participants who have high drug costs.
[14] The demand for habit-forming products responds more to price changes that last longer (Pollak 1970; Becker and Murphy 1988; Gallet 2014), which is why it would be especially problematic to apply the approach of Einav, Finkelstein, and Polyakova (2018) specifically to opioids because it refers to price changes lasting only a month. The estimates by Einav, Finkelstein, and Polyakova (2018) also exclude "social multiplier" price effects that may occur when the entire population experiences a price change, rather than a selected few who are at a special spot in their prescription-benefit formula (Glaeser, Sacerdote, and Scheinkman 2003).

Figure 7-12. Proportion of Users Obtaining Misused Prescription Opioids by Most Recent Source, 2013–14



Source: Lipari and Hughes (2017).

One reason that falling opioid prices may increase opioid deaths at a different rate than they increase opioid prescriptions is that opioid prices for medical purposes might follow a different trend than the prices paid by opioid misusers. In fact, only 25 percent of people who misuse prescription opioids most recently obtained the drugs from a doctor, while the remaining 75 percent obtained them from friends or relatives, via theft, from a drug dealer, or from some other source (figure 7-12). But even when the drugs are obtained on the secondary market, the price is likely positively correlated with the out-of-pocket price. A lower out-of-pocket price decreases the acquisition cost for those selling the drugs in the secondary market. It also should decrease the implicit price for those giving the drugs away with no expected reciprocal gifts, and it should reduce the precautions taken by individuals to safeguard their drugs against theft.[15] Of course, the out-of-pocket price is only one component of the total price of obtaining prescription opioids for misuse. The ease of finding a doctor to prescribe the opioids and a pharmacy that receives a supply and is willing to fill the prescription is also important.

As a calibration exercise for contextualizing whether falling out-of-pocket prices could have played a role in the first wave of the opioid crisis, we assume that the price of prescription opioid misuse is proportional to the out-of-pocket price. For example, a 10 percent decline in the out-of-pocket price of

[15] This does not mean that the amount of theft varies with the price because thieves can be expected to put more effort toward stealing more valuable items. We only assume that thieves experience greater cost of theft for high-priced items, due to owners' precautions.

prescription opioids is assumed to reduce the price of pills in the secondary market (and for misusers obtaining pills in the primary market) by 10 percent. This assumption is clearly reasonable for the 25 percent of prescription opioid misusers who obtain their pills directly from drugs prescribed by medical providers in the primary market because they only face the out-of-pocket price.

We may also expect the secondary market price to be proportional to the out-of-pocket price. Consider, first, the misusers who purchase their pills in the secondary market (as opposed to receiving them complimentarily). The sellers of these pills seek to maximize their profits, which are equal to the price of each pill *P* minus the cost of obtaining each pill in the primary market *C* (the out-of-pocket price), multiplied by the number of pills sold, *Q*:

$$\pi = (P - C)Q$$

In a competitive market, profits are competed down to zero for all sellers, so that the price charged on the secondary market is equal to the out-of-pocket price. In a noncompetitive market, each seller has the power to influence the secondary market price based on how many pills it sells. In terms of the equation above, this means that the price is a function of quantity. It can be shown that a necessary condition for maximizing profits is

$$P = \frac{1}{1 + r} C$$

where *r* is the responsiveness, in percentage terms, of the market price to the quantity of pills provided by a particular seller. Thus, an increase in the cost (or the out-of-pocket price) *C* leads to a proportional increase in the secondary market price *P*, assuming that *r* remains constant.

Assuming that the share of prescription opioids obtained via various segments of the secondary market with different markups remains constant over time, the average secondary market price across all segments would change proportionally with changes in the out-of-pocket price. It is important to emphasize that this assumption would be plausible only if suppliers to the secondary market face relatively low transaction costs for obtaining prescriptions from doctors and filling prescriptions from pharmacies. For this reason, changes in prescribing guidelines and practices, a greater emphasis on pain management, and the expansion of "pill mills" and supplies to pharmacies are preconditions for falling prices to have a potentially significant effect on opioid misuse.

Another reason that falling opioid prices can increase opioid deaths at a different rate than they increase opioid prescriptions is that most opioid prescriptions are likely used for medical purposes, and those who misuse opioids may have a different sensitivity to prices. One point of view is that medical users are less price sensitive because they are just following their providers' orders, whereas misusers are necessarily price sensitive to the extent that most

Table 7-1. Estimates of the Price Elasticity of Demand for Heroin

Studies	Study type and outcomes	Elasticity estimates
Silverman and Spruill (1977); Caulkins (1995); Dave (2008); Olmstead et al. (2015)	Outcomes related to heroin use (crime, emergency room visits, etc.)	–0.27; –1.50; –0.10; –0.80
Saffer and Chaloupka (1999)	National household surveys	–0.94
van Ours (1995); Liu et al. (1999)	Government historical records	–0.7 to –1.0; –0.48 to –1.38
Bretteville-Jensen and Biorn (2003); Bretteville-Jensen (2006); Roddy and Greenwald (2009)	Interviews with heroin users	–0.71 to –0.91; –0.33 to –0.77; –0.64
Petry and Bickel (1998); Jofre-Bonet and Petry (2008); Chalmers et al. (2010)	Laboratory studies	–0.87 to –1.3; –0.82 to –0.92; –1.54 to –1.73

Source: Olmstead et al. (2015).

of their income is exhausted by purchasing opioids.[16] Another perspective is that those who misuse opioids are less price sensitive because they are less interested in saving money on their drug acquisitions.

Unfortunately, we are not aware of studies estimating price elasticities for the misuse of prescription opioids distinctly from price elasticities for the overall number of prescription opioids (regardless of their use). Thus, we use estimates of the price elasticity of heroin, a substitute for prescription opioids, for which a large body of academic literature is available. Olmstead and others (2015) provide an extensive review of the literature and categorize studies based on the methods used—table 7-1 summarizes their work. Although the literature contains a broad range of estimates, studies generally find that higher prices reduce demand. For our calibration exercise, we rely on a meta-analysis of the literature on illicit drug price elasticities by Gallet (2014), who synthesizes 462 price elasticities from 42 studies, mostly based on U.S. data. He finds that the price elasticity of heroin falls in the range of –0.47 to –0.56, which coincides with the arc elasticity of –0.49 calculated from Soni's (2018) results for

[16] People who misuse opioids—who, for example, spend all disposable income on opioids—have a price elasticity of –1 because the quantity purchased is the ratio of disposable income to price. See Becker (1962) for a more general analysis.

prescription opioids but is further from zero than the short-run estimates for all prescription drugs reported by Einav, Finkelstein, and Polyakova (2018).[17]

Because previous studies show a range of price elasticities, we can only provide a range of estimates of the role of price changes as a factor in the growth of opioid misuse and the number of deaths involving prescription opioids. As a low value, we take one interpretation of the short-run findings of Einav, Finkelstein, and Polyakova (2018) for all prescription drugs, namely, that the price elasticity of demand is constant and equal to –0.27. As a middle value, we take the other interpretation of their results: that the demand curve is linear in price.[18] As a high value, we take Gallet's high-end elasticity of –0.56. The corresponding results for predicted deaths are shown in figure 7-13 as "low constant elasticity," "low linear demand," and "high constant elasticity," respectively.[19] For reference, figure 7-13 also shows the actual rate of overdose deaths involving prescription opioids. Price changes would be capable of explaining between 31 and 83 percent of the growth between 2001 and 2010 in the death rate involving prescription opioids, assuming that the rise in overdose deaths is proportional to the rise in misuse. In other words, without the price changes, the estimates suggest that there would have been between 11,500 and 22,800 fewer deaths involving prescription opioids during those years.[20]

Figure 7-13 suggests that a greater fraction of the increase in actual overdose deaths is explained with constant elasticity models (the red and gold lines in the figure) in 2010 than in earlier years, such as 2005. This pattern occurs because our price measure shows proportionally fewer price declines in the early years than in the later ones and likely reflects the substantial influences of nonprice factors (e.g., prescribing norms and marketing efforts) in addition to price factors. However, the linear demand specification shows a time pattern of predicted deaths (as opposed to a total increase) that is closer to actual deaths,

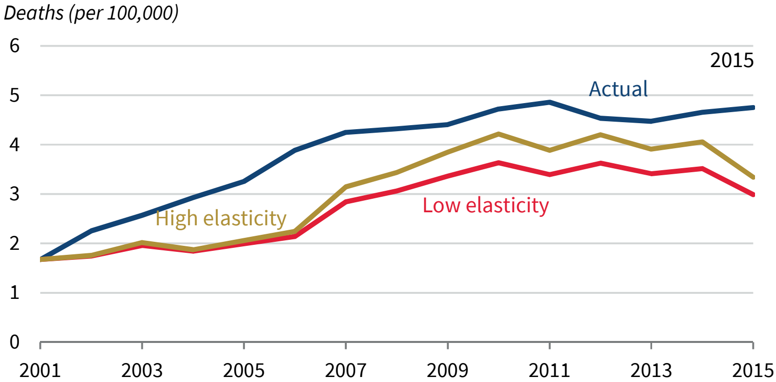
[17] Gallet (2014) finds that demand for drugs (1) is more responsive to price at the extensive margin (in decisions about whether to use drugs) than at the intensive margin (how much of the drug to use), and (2) is more responsive in the long run than in the short run.

[18] Einav, Finkelstein, and Polyakova (2018) calculate an elasticity of –0.15 based on percentage changes from the low price to the high price, which is a valid point elasticity only if the demand curve is linear in price, with a point elasticity of –0.15 at the average out-of-pocket price paid by low-cost Medicare Part D recipients between 2007 and 2011. It is a valid arc elasticity only if converted to –0.27 so that it can be applied to price increases as well as decreases.

[19] For the constant elasticity predictions, we use a demand function of the form $Q_D = AP^{\epsilon}$, where A is a parameter and determined based on the initial quantity and price as of 2001, Q_D is the quantity demanded, P is the price, and $\epsilon < 0$ is the constant elasticity of demand with respect to the price.

[20] Powell, Pacula, and Taylor (2017, 1) directly link the introduction of Medicare Part D—a source of some of the price reduction between 2001 and 2010—to deaths involving prescription opioids, including "deaths among the Medicare-ineligible population, suggesting substantial diversion from medical markets."

Figure 7-13. Actual and Predicted Rates of Overdose Deaths Involving Prescription Opioids, by the Price Elasticity of Demand for Misuse, 2001–15



Sources: CDC WONDER; Bureau of Labor Statistics; Medical Expenditure Panel Survey; National Drug Code database; CEA calculations.
Note: Predicted deaths are calculated by holding the demand curve constant and moving down the demand curve based on the amount of the price decrease. The functional form of the demand function is provided in the text. The low elasticity is 0.47; the high elasticity is 0.56.

which suggests that constant elasticity might not be the correct model of the effects of price changes.[21]

Again, it is important to emphasize that the potential role of prices in explaining the rise of overdose deaths depends on the ability of consumers in the primary market to obtain more pills as prices decline. This was facilitated by an environment in which prescribers were encouraged and even required to aggressively treat pain with opioids (President's Commission 2017).[22] As a result, physicians wrote more opioid prescriptions for more patients, lowering the amount of time and effort needed to acquire the drugs. In some places, the rise of pill mills further increased the convenience of acquiring these drugs by combining prescription writing with dispensing.

We further note that the death rate involving prescription opioids increased by a factor of 2.8 between 2001 and 2010 (figure 7-13), at the same time that the per capita quantity of prescription opioids increased by a factor of 2.6 (figure 7-11). This suggests that whatever factor was increasing prescriptions over this period was also increasing opioid use, with only somewhat

[21] Given that the research of price effects on drug sales finds most of them to be on the "extensive margin," the market demand curve largely reflects the inverse distribution of consumer heterogeneity. Distribution functions can generate convex demand functions like the constant-elasticity function, concave demand functions, or a combination of both, such as with the normal distribution.

[22] In technical terms, prescribing norms affect both the number of prescriptions at a given price and the sensitivity of that number to price changes.

greater proportional effects on misuse. One possible explanation for this result is that the price elasticity of misuse is similar to—but somewhat further from zero than—the price elasticity of medical use, so price declines increase both types of use but proportionally somewhat more for misuse.

Public Subsidies for Opioids

A potentially relevant factor for the 81 percent decline in out-of-pocket prices for prescription opioids between 2001 and 2010 is the expansion of public health insurance programs that subsidize access to and the purchasing of prescription drugs, including opioids. These subsidies lower out-of-pocket prices in the legal market, thereby lowering prices directly for the 25 percent of prescription opioid misusers who obtain their drugs from a physician and indirectly for the 75 percent of misusers (see figure 7-12) who receive them on the secondary market from friends, family, and dealers who first obtained the drugs in the primary market.[23]

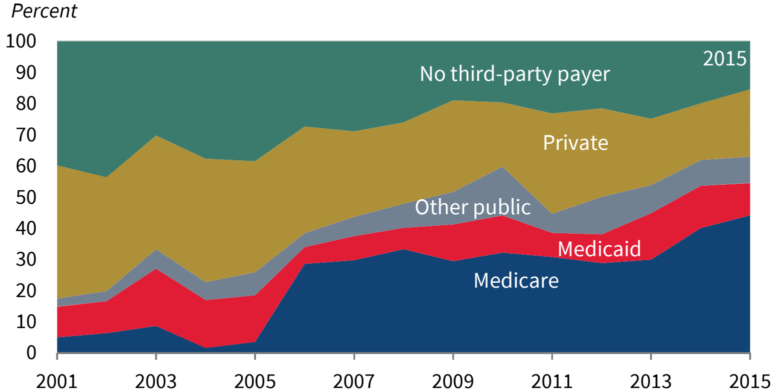
The share of potency-adjusted prescription opioids funded by government programs grew from 17 percent in 2001 to 60 percent in 2010 (figure 7-14). However, this may understate the share of diverted opioids that were obtained with the assistance of funding from public programs. The diversion of opioids to the secondary market is more profitable when out-of-pocket prices are lower, and drugs purchased with government subsidies cost less on average than drugs purchased out of pocket or with private insurance (MEPS). Thus, government subsidies that cut out-of-pocket prices the most may lead to opioids obtained with the assistance of funding from these programs to be the most likely to be diverted. In fact, government programs funded 74 percent of all opioids that were covered at least in part by a third-party payer in 2010 (MEPS).

Figure 7-14 shows the shares of potency-adjusted opioids covered by public programs, private insurers, and no third-party payer. Public programs have become much more important sources for funding opioids over time, and Medicare coverage expansions appear to have largely driven this growth. The share of opioids covered by Medicare spiked in 2006, coinciding with the implementation that year of Medicare Part D, which offers prescription drug benefits to Medicare beneficiaries.[24] It is important to note that the vast majority of Medicare Part D enrollees dispensed opioids do not misuse them. Carey, Jena,

[23] See Schnell (2017), who analyzes the linkages between the primary and secondary markets.

[24] In a similar calculation, Zhou, Florence, and Dowell (2016) find that the share of expenditures on prescription opioids accounted for by Medicare increased from 3 percent in 2001 to 26 percent in 2012. As shown in figure 7-14, we find that the number of prescriptions for which Medicare was the primary payer increased from 5 percent in 2001 to 29 percent in 2012. The slight differences may be because the Medicare share of expenditures (as reported by Zhou, Florence, and Dowell 2016) does not include out-of-pocket copayments made by Medicare enrollees for prescriptions where Medicare was the primary payer (figure 7-14).

Figure 7-14. Share of Potency-Adjusted Prescription Opioids, by Primary Payer, 2001–15



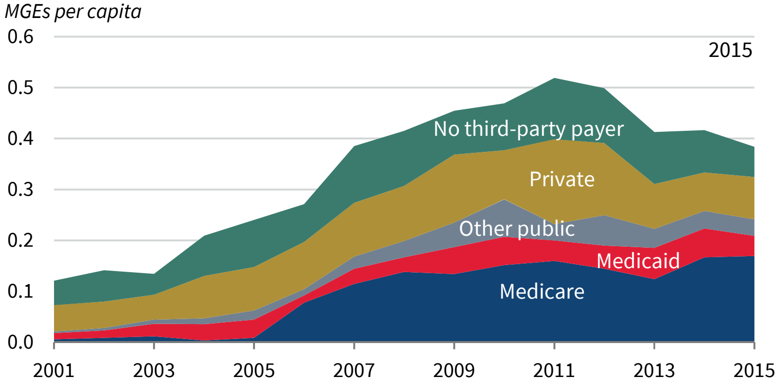
Sources: Medical Expenditure Panel Survey; National Drug Code Database; CEA calculations.
Note: The primary payer is defined as the third-party payer with the highest payment for a given prescription. In addition to Medicare, Medicaid, and private insurers, the other possible primary payers include veterans' benefits, workers' compensation, other Federal government insurance, other State or local government insurance, or other public insurance. All prescriptions are converted into morphine gram equivalents based on the quantity of pills prescribed and their potency, using the National Drug Code database.

and Barnett (2018) studied a sample of more than 600,000 Medicare beneficiaries who had an opioid prescription. Using several different measures, only 0.6 to 8.5 percent of the beneficiaries fulfilled a misuse measure.

The implementation of Medicare Part D and the resulting growth in the share of opioids funded by Medicare do not appear to have simply displaced opioids covered by other sources. Figure 7-15 shows the quantity of opioids per capita funded by each source. Though the number of potency-adjusted opioids covered by Medicaid fell between 2005 and 2006, the increase in the number of opioids covered by Medicare was over three times larger than this decline.[25] The number of potency-adjusted opioids covered by private insurance also increased between 2005 and 2006. Furthermore, between 2005 and 2008, the MEPS data suggest that the total quantity of potency-adjusted opioids that

[25] An estimated 6.2 million Medicaid beneficiaries became eligible for Medicare Part D prescription drug coverage on January 1, 2006 (KFF 2006). These "full dual eligibles" included low-income seniors and low-income disabled individuals under age 65. Nonelderly disabled dual eligibles, including both full and partial, made up about one-third of all duals (2.5 million out of almost 7.5 million—per Holahan and Ghosh 2005, 3). Applying this one-third ratio to 6.2 million means that about 2.0 to 2.1 million nonelderly disabled Medicaid participants transitioned from Medicaid to Medicare prescription drug coverage in 2006. For comparison, the SSDI rolls grew from 6.5 million to 6.8 million individuals between 2005 and 2006.

Figure 7-15. Potency-Adjusted Prescription Opioids per Capita, by Primary Payer, 2001–15



Sources: Medical Expenditure Panel Survey; National Drug Code Database; CEA calculations.
Note: MGEs = morphine gram equivalents. The primary payer is the third-party payer with the highest payment for a given prescription. In addition to Medicare, Medicaid, and private insurers, the other possible primary payers include veterans' benefits, workers' compensation, other Federal government insurance, other State or local government insurance, or other public insurance. All prescriptions are converted into MGEs based on the quantity of pills prescribed and their potency, using the National Drug Code Database.

were dispensed increased by 73 percent, with almost three-fourths of this growth coming from opioids paid for by Medicare.[26]

Between 2001 and 2010, Medicare-covered opioids increased by over 2,400 percent, Medicaid-covered opioids increased by over 360 percent, and total publicly covered opioids increased by over 1,200 percent (MEPS). Given that Medicare covers the elderly and SSDI recipients who tend to have greater needs related to pain relief, it is not surprising that Medicare is the largest payer of prescription drugs as well as the largest public payer of prescription opioids.

Previous research has studied the implications of the rise in public funding for opioids fueling the opioid crisis and, in particular, the diversion of pills to the secondary market. Powell, Pacula, and Taylor (2017) found that a Medicare Part D–driven 10 percent increase in opioid prescriptions results in 7.4 percent more opioid-involved overdose deaths among the Medicare-ineligible population. The authors use the fact that Medicare Part D was plausibly more important in driving prescription drug benefits in States with a greater share of the population over age 65 to estimate the impact of drug benefits on opioid-involved overdose deaths.

[26] As shown in a comparison of figures 7-11 and 7-15, the MEPS data undercount the total number of prescription opioids. See also Hill, Zuvekas, and Zodet (2011, 242), which looks more systematically at the propensity of MEPS respondents "to underreport the number of different drugs taken." MEPS underreporting presents greater challenges for measuring total quantities rather than average prices, which is why the CEA measures the former from ARCOS and the latter from MEPS.

Moreover, because the elderly—the major population that is eligible for Medicare benefits—are a disproportionately small fraction of those reported to die of drug overdoses, these results suggest that the impact of Medicare expansion on opioid-involved death rates may have been due to an increased supply of prescription opioids in the secondary market. Others have examined opioid prescriptions covered by Medicaid.[27] In a recent report, the U.S. Senate Committee on Homeland Security and Governmental Affairs (2018) notes numerous examples of Medicaid fraud that fuel abuse of prescription opioids—for example, with drug dealers paying Medicaid recipients to obtain taxpayer-funded pills.

Similarly, Eberstadt (2017) suggests that Medicaid has helped finance increasing nonwork by prime-age adults by subsidizing prescription opioids that could be sold on the secondary market. Goodman-Bacon and Sandoe (2017), Venkataramani and Chatterjee (2019), and Cher, Morden and Meara (2019), however, find little evidence for Medicaid expansion fueling the opioid crisis. These findings are not necessarily inconsistent with other evidence that public programs worsened the opioid crisis. It is possible that Medicaid expansion did not increase opioid misuse because the expansion population is less likely to be prescribed opioids. Before State expansions, Medicaid already covered all disabled adults receiving Supplemental Security Income (SSI), as well as elderly adults not eligible for Medicare. Medicaid expansion only covered nondisabled, nonelderly adults with low incomes, a population less likely to be prescribed opioids. In fact, figure 7-15 shows that the per capita quantity of opioids covered by Medicaid decreased between 2013 and 2015, despite the fact that Medicaid enrollment grew from 60 million to 70 million people over this same period, as the majority of States expanded Medicaid coverage. In addition, the Medicaid expansions studied by Goodman-Bacon and Sandoe (2017) occurred in 2014, after measures had been taken to reduce the ability of people to misuse prescription opioids (e.g., the reformulation of OxyContin in 2010 and the introduction of other medicines along with the rescheduling of certain opioids to higher schedules with more restrictions).

Public subsidies for prescription opioids have also been fueled by the growing number of Americans claiming disability insurance. SSDI is a Federal disability assistance program that offers a maximum possible benefit of $2,687 a month, with an average monthly benefit of $1,173. Only adults who have significant work experience are eligible to receive SSDI, and the amount of

[27] In 2017, 15.6 percent of the total U.S. population was age 65 or older, but only 3.6 percent of all opioid-involved overdose deaths were age 65 or older (CDC WONDER).

benefits is higher for those who had higher lifetime earnings before becoming disabled.[28]

SSDI disabled workers are generally eligible for Medicare after 24 months of enrollment in the program. SSDI rolls have increased dramatically since 1990. The growth in SSDI rolls can be attributed to several factors, including the aging of the population, the increased labor force participation of women, and more lenient disability determinations (Autor 2015). Another disability program, SSI, provides more modest benefits to Americans without sufficient work experience to qualify for SSDI, and provides automatic eligibility for Medicaid in most States. Figure 7-16 shows the rise in SSDI and SSI rolls per 100,000 people over time. Notably, SSDI rolls and opioid overdose deaths, especially those involving prescription opioids, have risen in tandem. It is also important to note SSDI growth occurred over the same period as increased treatment of pain conditions with opioids.

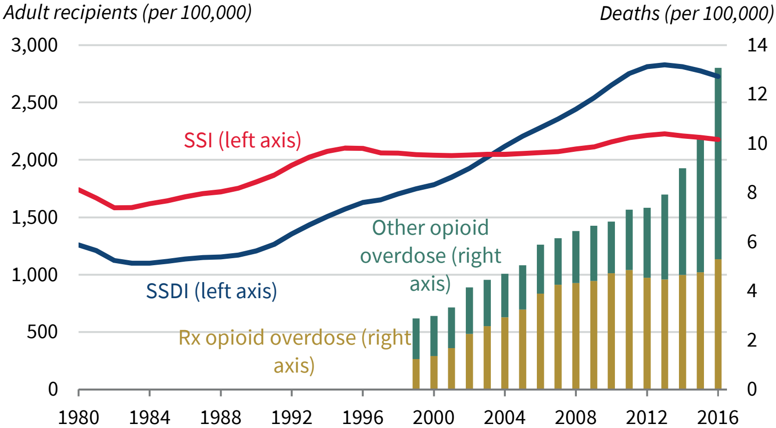
The 8.6 million SSDI disabled workers in 2011 represent less than 3 percent of the total U.S. population, and thus are overrepresented as a source of prescription opioids given disabilities (increasingly related to pain) that lead to a greater use of prescription opioids. The CEA estimates the total market share of SSDI recipients in two ways, each suggesting that SSDI recipients make up about 26 to 30 percent of the prescription opioid market. First, we use data from Morden and others (2014), who estimate the average potency-adjusted opioid prescriptions for SSDI recipients across the United States in 2011 (6.9 MGEs per SSDI recipient). We multiply this average rate by the total number of SSDI recipients in 2011 (8.6 million recipients). And finally, we divide the total opioids prescribed to SSDI recipients (59.2 million MGEs) by the total opioids distributed in the United States according to ARCOS data (196.9 million MGEs). The result is that 30 percent of potency-adjusted opioid prescriptions in the U.S. are filled by SSDI recipients, which is over 10 times their proportion of the U.S. population.

Second, the CEA uses MEPS data that report opioid prescriptions for a random sample of Americans each year. We identify SSDI recipients as individuals between age 18 and 64 who receive Medicare. This may slightly overstate the SSDI population, given that a small number of non-SSDI recipients under age 65 are eligible for Medicare as well, including people with end-stage renal disease and amyotrophic lateral sclerosis.[29] Nonetheless, dividing the potency-adjusted opioids prescribed to these recipients by the total in the population

[28] Qualification for SSDI requires a sufficient number of work credits that were earned recently enough. Up to 4 credits can be earned in one year and are accrued based on sufficient annual earnings. Applicants generally require 40 credits to qualify for SSDI, although standards are different for younger workers.

[29] There were just under 273,000 Medicare recipients under age 65 with end-stage renal disease in 2013 (HHS 2014). The prevalence of amyotrophic lateral sclerosis is just 5 per 100,000, implying that in 2013, there were just under 16,000 Americans with the disease (Stanford Medicine n.d.).

Figure 7-16. Adults Receiving Social Security Disability Insurance and Supplemental Security Income, and Opioid-Involved Drug Overdose Deaths, per 100,000 People, 1980–2016



Sources: Social Security Administration; CDC WONDER; CEA calculations.
Note: SSDI = Social Security Disability Insurance. SSI = Supplemental Security Income. Prescription opioids include natural and semisynthetic opioids as well as methadone. Data for opioid overdose deaths were accessed in CDC WONDER beginning in 1999.

results in an estimated SSDI market share of 26 percent for the period 2010–12.[30] The somewhat lower share estimated using MEPS data may be due to the exclusion of SSDI recipients who have been on the program for less than two years.[31] These SSDI recipients would not yet be eligible for Medicare and may instead receive coverage via Medicaid or other programs.[32]

It is important to emphasize that the disproportionate market share of SSDI recipients receiving prescription opioids is a result of their higher levels of conditions that prevent them from working and that may also cause pain. SSDI benefit payments, in conjunction with Medicare coverage, provide a vital means of support for disabled workers with major healthcare needs. Thus, reforms that seek to reduce nonmedical use of opioids should be careful to preserve access to needed pain relief through the medical use of opioids for SSDI recipients.

[30] Based on a five-year average centered on 2011, we similarly estimate a market share of 26 percent.
[31] MEPS excludes the institutionalized population, so if SSDI recipients are overrepresented in this population, this could further affect our estimate.
[32] We note that Finkelstein, Gentzkow, and Williams (2018) estimate that SSDI recipients account for about 13 percent of opioid prescriptions. However, they do not appear to analyze potency-adjusted opioids, as we do. Indeed, when we use the MEPS data to estimate the market share of non-potency-adjusted opioid prescriptions for the same 2006–14 period that Finkelstein, Gentzkow, and Williams (2018) appear to consider, we estimate a similar 15.5 percent market share.

The Second Wave of the Crisis: Illicit Opioids

The second wave of the opioid crisis began in about 2010, when prescription opioids became more difficult to access due to efforts to rein in abuse. However, the buildup of a pool of people misusing prescription opioids that they could no longer access provided a large pool of new demand and a profit opportunity for sellers entering the illicit opioid market. Because, for people suffering from addiction, legal and illicit opioids can function as substitutes, raising the price (in terms of both money and time) of legal opioids raises the demand for illicit ones.

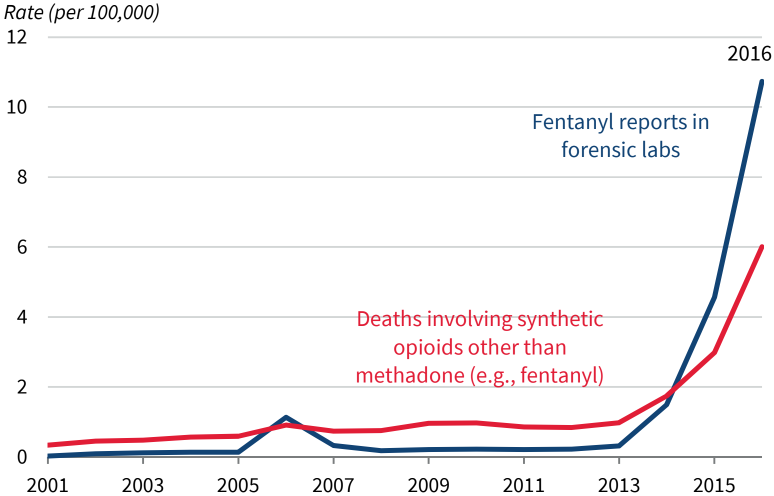
The reformulation of OxyContin in 2010 made it more physically difficult to use. States have implemented prescription drug monitoring programs that require doctors to consult patient prescription histories before prescribing opioids (Dowell et al. 2016; Buchmueller and Carey 2018; Dave, Grecu, and Saffer 2018). Professional societies and accrediting organizations have reconsidered their pain treatment guidelines. These changes have reduced the overall quantity of prescription opioids distributed, with potency-adjusted quantities of opioids peaking in 2011 (DOJ n.d.). Unfortunately, recent research has shown that overdose deaths averted from prescription opioid overdoses, at least those resulting from the reformulation of OxyContin, have been replaced by overdose deaths from heroin (Alpert, Powell, and Pacula 2018; Evans, Lieber, and Power 2019).

As users have substituted toward heroin, it has increasingly been made even more potent—suppliers and drug dealers now frequently lace heroin with illicitly manufactured fentanyl. Fentanyl is 30 to 50 times more potent in its analgesic properties than heroin, so even small amounts can vastly increase the potency of the drugs with which it is mixed. Illicitly manufactured fentanyl can also be obtained independently of heroin. Figure 7-17 documents the rise of fentanyl, showing both the rate of overdose deaths involving synthetic opioids other than methadone (a category dominated by fentanyl, although whether the product is illicit or by prescription is not determinable), and the rate of fentanyl reports in forensic labs acquired by law enforcement during drug seizures.

Figure 7-18 shows the rise in overdose deaths involving heroin and fully synthetic opioids (mostly fentanyl), along with opioid deaths not involving heroin and synthetic opioids. As a reminder, we refer to overdose-related opioid deaths from heroin and fentanyl as “illicit deaths,” even though fentanyl can also be prescribed.[33] From 2010 through 2016, the rate of illicit opioid deaths has increased by 364 percent, while the rate of opioid deaths not involving illicit opioids has fallen by 17 percent. Importantly, fentanyl also tends to be combined with nonopioids, and deaths in which fentanyl and nonopioids are factors are included in the illicit opioid series shown in figure 7-18.

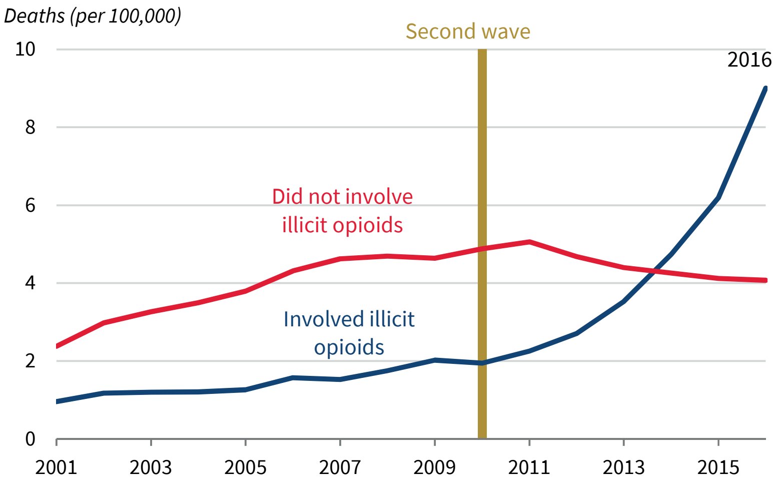
[33] We use ICD-10 codes T40.1 and T40.4 to identify deaths involving heroin and fentanyl.

Figure 7-17. Rate of Overdose Deaths Involving Synthetic Opioids Other Than Methadone, and Fentanyl Reports in Forensic Labs per 100,000 Population, 2001–16



Sources: National Forensic Laboratory Information System; DOJ and DEA (2017b); CDC WONDER; CEA calculations.

Figure 7-18. The Opioid-Involved Overdose Death Rate by the Presence of Illicit Opioids, 2001–16



Sources: CDC WONDER; CEA calculations.
Note: Illicit opioids include both heroin (T40.1) and the category "synthetic opioids other than methadone" (T40.4) in the CDC data, which is primarily composed of illicitly produced fentanyl.

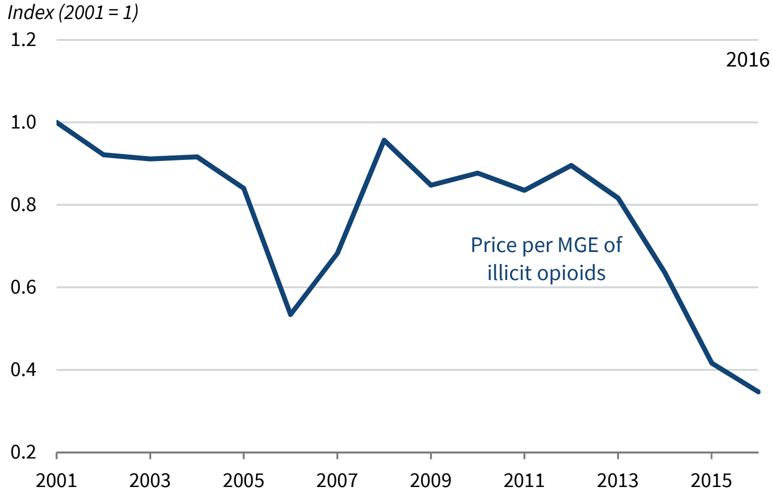
Given their illegal nature, the price of illicit opioids is more difficult to measure than the price of prescription opioids. Accurate data cannot be reliably obtained from dealers or users, who may fear criminal sanctions for truthful reporting. In recent years, the influx from Mexico and China of cheap but highly potent fentanyl, which can vastly increase the potency of drugs with which it is mixed, has complicated matters (U.S. Department of State n.d.). Market quantities of heroin and fentanyl also cannot be directly observed, so the extent to which added fentanyl reduces the price per potency-adjusted unit of opioids is difficult to determine. Subject to these limitations, the CEA has assembled data from several sources to create a time series for the price of illicit opioids.

The Drug Enforcement Administration's (DEA's) System to Retrieve Information from Drug Evidence (STRIDE) and STARLIMS databases collect heroin price data. Heroin prices in these data sets are obtained by government agents, who pay informants to purchase heroin on the street. The price is recorded, and the heroin sample is analyzed in a laboratory to determine its potency so that prices can be adjusted for quality. Between 2010 and 2016, the potency-adjusted real price of heroin increased by 10 percent.

However, any fentanyl contained within heroin is not considered when determining the price per pure gram of heroin in the DEA data. Thus, the true price per potency-adjusted unit of heroin purchases has likely increased by less than 10 percent or has even declined. In addition, fentanyl can be consumed on its own outside heroin, which, if cheaper on a potency-adjusted basis, would lead overall illicit opioid prices to fall even more. Moreover, increased heroin purity and product modifications have increasingly allowed for heroin use by means other than injection. These changes lower the nonmonetary costs of using heroin, and although nonmonetary costs are not estimated here, these changes would have further reduced the cost of illicit opioid use.

The CEA uses data from several sources to estimate the quantity of fentanyl mixed with heroin and available on its own, along with the potency-adjusted price of heroin (including the fentanyl with which it is mixed) and the potency-adjusted price of fentanyl when consumed alone or with other drugs. Quantity data are based on seizures of heroin and fentanyl recorded in the National Seizure System, along with exhibits of each drug recorded in the National Forensic Laboratory Information System. Price data are based on the DEA heroin price series and on DEA reports on the cost of fentanyl relative to heroin, along with the quantity data in order to adjust heroin prices based on fentanyl with which it is mixed. A detailed methodology for estimating illicit opioid prices is provided in the appendix of a previously published CEA report (CEA 2019b). We acknowledge that seizure data are a highly imperfect proxy of the relative presence of heroin and fentanyl. Seized products reflect a combination of market shares and law enforcement priorities rather than market shares

Figure 7-19. Real Price Index of Potency-Adjusted Illicit Opioids, 2001–16



Sources: National Seizure System; National Forensic Laboratory Information System; U.S. Bureau of Labor Statistics; ONDCP (2017); DOJ and DEA (2017a, 2017b); CEA calculations.
Note: MGE = Morphine gram equivalent.

alone. Still, absent an alternative data source, and without a clear direction for the bias in this proxy for market shares, we use the seizure data as reported.

Figure 7-19 shows a real price index for illicit opioids between 2001 and 2016, which, given the data limitations involved, should be used only to draw qualitative conclusions. The price of illicit opioids is relatively stable before falling temporarily in 2006, and then quickly recovering, and then falls by over half (58 percent) between 2013 and 2016. Each of these declines is due to surges in fentanyl that is either mixed with heroin or sold on its own or with other drugs. The 2006 price decline was due to a laboratory in Mexico that dramatically increased the supply of fentanyl to the United States but was quickly shut down through cooperative action between the United States and Mexico. The price decline between 2013 and 2016 is attributed to the widely documented influx of fentanyl into the United States, including from China and Mexico (NIDA 2017). The price series shown in figure 7-19 is the outcome of a series of assumptions documented more completely in the appendix of the CEA's previously published report and is necessarily only a highly imperfect estimate of the real price from which only qualitative conclusions should be drawn (CEA 2019b). If data on the illicit opioid market in this period improve, revisions to this series may be possible.

It is clear from figure 7-19 that supply expansions were important for driving the growth in overdose deaths involving illicit opioids. Between 2010 and 2013, the price of illicit opioids was relatively stable. This implies that both supply and demand expansions were important during the first three years of the illicit wave of the opioid crisis. If only demand had expanded, then prices would have increased; and if only supply had expanded, then prices would have decreased. Demand expansions can likely be traced at least in part to efforts to clamp down on abuse that grew during the first wave of the crisis without providing additional access to quality treatment services. Expanded supply is likely due to increased supply from source countries, including Mexico and Colombia, and it may reflect a substitution of drug production from marijuana (which has been legalized or decriminalized in some U.S. States) to heroin (ONDCP 2019). Meanwhile, supply expansions are likely more important than demand expansions for the 2013–16 period, given that the price of illicit opioids fell by more than half during these three years. The shift toward fentanyl produced in China and distributed through the mail has increased the potency of drugs without significantly increasing their prices, and may have increased competition in the illicit opioid market, thereby also putting downward pressure on the price of heroin.

To the extent that monetary price declines have been accompanied by an increased ease of obtaining illicit opioids (given the proliferation of drug dealers in more locations and the increased availability of online markets), supply expansions may have been even more important than the falling illicit price series suggests. For instance, Quinones (2015) notes that Mexican heroin dealers who illegally cross the border have become much more efficient in delivering heroin to users rather than forcing users to find them. These drug dealers communicate with users via cell phones to establish a place to meet, at which point the user enters the dealer's car to receive their heroin.

Conclusion

The opioid crisis poses a major threat to the U.S. economy and American lives, and many factors have exacerbated this threat. In addition to taking more than 400,000 lives since 2000, the opioid crisis cost $665 billion in 2018, or 3.2 percent of U.S. gros domestic product. In this chapter, the CEA presents evidence that falling prices may have played a role in increasing opioid misuse and opioid-involved overdose deaths.

During the first wave of the opioid crisis, which was characterized by growing overdose deaths involving prescription opioids between 2001 and 2010, the out-of-pocket price of prescription opioids fell by 81 percent. This likely reduced the price of prescription opioids in the secondary market, from which most people who misuse prescription opioids obtain their drugs. Using the proportional price assumption and given elasticities from the academic literature, we find that the decline in observed out-of-pocket prices is capable of explaining between 31 and 83 percent of the growth in the number of overdose deaths involving prescription opioids between 2001 and 2010. At the same time that out-of-pocket prices were falling, government subsidies and the market share of generic opioids were expanding. We estimate that the share of prescribed opioids funded by government programs increased from 17 percent in 2001 to 60 percent in 2010 (and to 63 percent in 2015). The share of publicly funded opioids diverted to the secondary market may be even higher, given the relatively low acquisition cost for suppliers of diverted opioids.

Falling prices could not elicit a change in the quantity of opioids misused and the resulting opioid deaths unless providers were encouraged to prescribe the opioids, health plans were paying for the prescriptions, and pharmacies were filling these prescriptions. We describe the change in the environment resulting from changing pain management guidelines and aggressive marketing tactics that reduced barriers to obtaining larger quantities of opioids.

The CEA finds that the second wave of the opioid crisis—characterized by growing deaths from illicit opioids between 2010 and 2016—was driven by a combination of supply and demand expansions. Efforts to restrict the supply and misuse of prescription opioids led an increased number of users from the first wave to substitute illicit opioids in place of prescription opioids. At the same time, the supply of illicit opioids expanded, and this substitution decreased quality-adjusted prices to reduce the "cost of a high." Despite the importance of demand through a substitution effect in the initial years of the second wave, the CEA finds that the evidence supports the idea that supply expansions have been more important causes of the crisis's growth than demand increases.

The Trump Administration has taken significant steps to stem the tide of the opioid crisis. In October 2017, the Administration declared a nationwide Public Health Emergency. President Trump later established his Initiative to Stop Opioid Abuse and Reduce Drug Supply and Demand in March 2018 (White House 2018). These and other measures taken by the government include securing more than $6 billion in new funding in 2018 and 2019 to address the opioid crisis by reducing the supply of opioids, reducing new demand for opioids, and treating those with opioid use disorder.

To restrict the supply of illicitly produced opioids, there have been increased efforts to prevent the flow of illicit drugs into the U.S. through ports of entry and international shipments. The President also signed into law the International Narcotics Trafficking Emergency Response by Detecting Incoming Contraband with Technology (INTERDICT) Act, which funds U.S. Customs and Border Protection (CBP) to expand technologies to help interdict illicit substances including opioids. The CBP is also training all narcotic detector dogs at ports of entry to detect fentanyl. These efforts have seen success—during fiscal year 2019, the CBP seized almost 2,800 pounds of fentanyl and over 6,200 pounds of heroin (CBP 2019). The Administration has also increased enforcement against illicit drug producers and traffickers. In 2018, the Department of Justice (DOJ) indicted two Chinese nationals accused of manufacturing and shipping fentanyl analogues, synthetic opioids, and 250 other drugs to at least 37 U.S. States and 25 other countries (DOJ 2018). In addition, the Department of the Treasury has levied kingpin designations against fentanyl traffickers that operate in China, India, the United Arab Emirates, and Mexico, and also throughout Southeast Asia, including Vietnam, Thailand, and Singapore. To stop the flow of this deadly drug before it reaches Americans, the Administration is working with more than 130 nations that signed onto President Trump's Call to Action on this issue. The Federal government is also engaging private sector partners to help secure U.S. supply chains against traffickers attempting to exploit those platforms (ONDCP 2019). One example is the promotion of increased private sector self-policing of products entering the U.S. via third-party marketplaces, and other intermediaries to an e-commerce transaction (via the Department of Homeland Security).

Immigrations and Customs Enforcement's Homeland Security Investigations (HSI) organization has also increased its efforts targeting transnational criminal organizations (TCO) involved with the opioid epidemic. HSI has increased its partnerships—such as the Border Enforcement Security Taskforce (BEST) platforms—with other Federal, international, tribal, State, and local law enforcement agencies to increase information and resource sharing within U.S. communities. BESTs eliminate the barriers between Federal and local investigations (access to both Federal and State prosecutors), close the gap with international partners in multinational criminal investigations, and create an environment that minimizes the vulnerabilities in our operations that TCOs have traditionally capitalized on to exploit the Nation's land and sea borders.

To better combat 21st-century crime exploiting ecommerce, HSI has increased its presence at international mail facilities and express consignment centers by establishing BESTs at John F. Kennedy International Airport in New York, Los Angeles International Airport, Memphis International Airport, Cincinnati–Northern Kentucky International Airport, and Louisville International Airport as part of HSI's comprehensive and multilayered strategy to combat TCOs and their smuggling activities. This strategy facilitates the immediate application of investigative techniques on seized parcels, which aid in establishing probable cause needed to effect enforcement actions on individuals associated with narcotics laden parcels. Consequently, these seizures and arrests disrupt the movement of narcotics transiting through the mail and express consignment shipments, and aid in the dismantling of distribution networks. BEST partners with the CBP, the United States Postal Inspection Service, and DEA at these facilities. As of September 2019, BESTs are located at 69 locations throughout the nation, including Puerto Rico.

Along with reducing the supply of opioids, Federal and State governments are also playing a key role in curtailing the demand for prescription and illicit opioids. Prescription drug monitoring programs that track controlled substance prescriptions are operational in 49 states, the District of Columbia, and Guam, and they can provide timely information about prescribing and patient behaviors that exacerbate the crisis and enable response (CRS 2018). In 2017, the number of high-dose opioid prescriptions dispensed monthly declined by over 16 percent, and the prescribing rate of opioids fell to its lowest rate in more than 10 years. The Administration has also invested over $1 billion in innovative research to develop effective nonopioid options for pain management. In addition to reducing opioid prescriptions to decrease new initiates to opioid misuse, the Administration has launched information campaigns to create awareness and inform the public about opioid use disorder to prevent new drug users. In June 2018, the White House's Office of National Drug Control Policy, the Ad Council, and the Truth Initiative announced a public education campaign over digital platforms, social media, and television targeting youth and young adults. Importantly, nearly 60 percent fewer young adults between the age of 18 and 25 began using heroin in 2018 than in 2016.

Improved guidelines are also being established to target the vulnerable veteran population, who are twice as likely as the average American to die from an opioid drug overdose (Wilkie 2018). The Department of Veterans Affairs (VA) and the Department of Defense updated their Opioid Safety Initiative in 2017 to provide prescribers with a framework to evaluate, treat, and manage patients with chronic pain, including ways to better aggregate electronic medical records and track opioid prescriptions. In the first six years of the program, from 2012 to 2018, the number of veteran patients receiving opioids was reduced by 45 percent. Over the same period, the number of veterans on long-term opioid therapies declined by 51 percent and the number of veterans on high-dose opioid therapies declined by 66 percent (Wilkie 2018).

Finally, the Administration is also focusing on treating and saving the lives of those currently struggling with opioid addictions by expanding access to the life-saving drug naloxone and other evidence-based interventions, such as medication-assisted treatment and other recovery support services. Prevention of drug use is important, but in addition, the Trump Administration has invested in increased treatment and recovery support for people who suffer from opioid use disorder. The Surgeon General has promoted access and carrying naloxone, the lifesaving reversal agent of an opioid overdose. In October 2018, President Trump signed into law the bipartisan Substance Use Disorder Prevention That Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act, which includes provisions to improve substance use disorder treatments for Medicaid patients and to expand Medicare coverage of opioid use disorder treatment services. In fiscal years 2018 and 2019, a total of $3 billion was appropriated for State grants to fund opioid use disorder prevention and treatment. Many States—including West Virginia, Indiana, Wyoming, Tennessee, Florida, and Virginia—have implemented legislation to expand the availability of naloxone, and inpatient and outpatient use of the life-saving treatment is increasing (ASTHO 2018).

Many of the measures taken by the Trump Administration to cut the supply of opioids, prevent new demand, and save the lives of those currently struggling with opioid use disorders may have contributed to the flattening growth of overdose deaths involving opioids. Between January 2017 and May 2019, monthly overdose deaths fell by 9.6 percent. If the growth rate in opioid overdose deaths from January 1999 through December 2016 had continued, the CEA estimates that 37,750 additional lives would have been lost due to opioid overdoses between January 2017 and May 2019. The CEA estimates the economic cost savings since January 2017 from reduced mortality compared with the preexisting trend was over $397 billion. The opioid crisis remains at an emergency level, but its dramatic growth has been halted. Despite successful efforts to curb the opioid crisis and stop the increase in overdose deaths, there has been an increase in psychostimulant-related overdose deaths, primarily driven by methamphetamine use, that is a cause of concern. Psychostimulant-related deaths now outnumber fentanyl deaths in 12 States (Wilner 2019).

The economic and human costs of drug misuse continue to pose a threat to the United States. The Trump Administration is working to determine the underlying causes of the opioid crisis so that it can implement effective solutions. Lower drug prices clearly played a role in the opioid crisis's growth, and understanding this dynamic will help policymakers successfully respond to this threat and avoid mistakes that could lead to another costly, deadly crisis.